

MERIE PLASMA REACTOR WITH OVERHEAD RF ELECTRODE
TUNED TO THE PLASMA WITH ARC SUPPRESSION

ABSTRACT OF THE DISCLOSURE

5 A plasma reactor for processing a semiconductor workpiece,
includes a reactor chamber having a chamber wall and containing
a workpiece support for holding the semiconductor support, the
electrode comprising a portion of the chamber wall, an RF power
generator for supplying power at a frequency of the generator to
10 the overhead electrode and capable of maintaining a plasma
within the chamber at a desired plasma ion density level. The
overhead electrode has a capacitance such that the overhead
electrode and the plasma formed in the chamber at the desired
plasma ion density resonate together at an electrode-plasma
15 resonant frequency, the frequency of the generator being at
least near the electrode-plasma resonant frequency. The reactor
further includes a set of MERIE magnets surrounding the plasma
process area overlying the wafer surface that produce a slowly
circulating magnetic field which stirs the plasma to improve
20 plasma ion density distribution uniformity.